HYDROLOGICAL SUMMARY FOR ENGLAND AND WALES
APRIL 1989

Data for this April review have been provided, principally, by the Water Authorities and the Meteorological Office.

A substantial proportion of the recent data featured in this note is of a provisional nature and subject to later revision.

Summary

April was a wet month, notably so in some areas, and the water resources situation continued the improvement which began in mid-February. Soils remained close to field capacity throughout April and runoff and aquifer recharge totals were substantially greater than the monthly average over wide areas. Whilst total 1988/89 replenishment of the principal aquifers remains below normal, the late surge in infiltration over the last 8-10 weeks is especially beneficial - levels in most index boreholes are expected to be close to the average by mid-May and the outlook for baseflow supported rivers is reassuring.

Review

In contrast with much of the preceding winter, April was cold and wet. A sequence of frontal systems brought unsettled conditions and several episodes of prolonged steady rainfall. Rainfall totals a little below average were recorded in South Wales and along the north-east coast but elsewhere precipitation was abundant; substantial areas of central England had more than twice the April mean and, generally, rainfall over the outcrop areas of the major aquifers exceeded 150 per cent. The continuing decline in the drought's intensity may be traced by reference to Table 1; accumulated rainfall totals from the beginning of October are now within about 15 per cent of the mean in all water authority areas with the exception of Southern Water. The unevenness of the temporal distribution of rainfall is remarkable. For example, the Thames catchment experienced its wettest February-April period in a decade following the driest three-months (commencing in November) in a 106 year record. However, impressively high percentage rainfall totals for March and April can be somewhat misleading - on average these are among the driest months of the year in the South East - and the excess rainfall has been insufficient to fully compensate for the longer term deficiencies in parts of lowland England (see Figure 1). In the 13-months ending in April 1989, a considerable shortfall may still be recognised in some southern districts and this remains significant in relation to the refilling of reservoirs in one or two catchments.

The low temperatures and limited sunshine during April served to postpone the normal seasonal build-up of soil moisture deficits. Soils remained close to, or at, field capacity until the end of the month when SMDs were between 15 and 30 mm below average throughout central and southern England.

Monthly mean river flows for April were above, or well above, average throughout England and Wales except in rivers which are sustained principally from groundwater. In such catchments flows remain significantly below the mean but are, generally, increasing in response to the recent aquifer recharge and there is every prospect of the late spring flows falling well within the normal flow range (see Figure 2). Table 2 summarises the current runoff situation; of the rivers featured only the Lune, Lud (substantially), Kennet, Test and Itchen registered April runoff

totals below the corresponding figure for 1988; in most catchments runoff was appreciably greater. Accumulated runoff totals since October 1988 are still relatively modest in lowland England but the very healthy discharge rates maintained since early March contrast sharply with the spring flows registered before the summer droughts of 1959, 1964, 1973, 1976 and 1984.

Heavy percolation rates throughout April led to a marked improvement in groundwater resources at a time when water table recessions are normally well established in most areas. Quantifying the improvement is complicated by the different lag times of individual observation wells; these reflect the depth of the wells and the characteristics of the individual aquifer units.

In the Great Oolite aquifer of the Cotswolds groundwater levels peaked in late March/early April - at a level close to the normal spring maximum - and are now in decline. By contrast, the water table is still rising in the Chilterns and parts of the North Downs. Generally the delayed recharge has resulted in groundwater levels in early May approaching, or - in western districts - exceeding the monthly average. Some further modest response to the April infiltration may be anticipated in the deeper wells but 1988/89 recharge is still minimal in parts of the Yorkshire Chalk (see Fig. 3), northern East Anglia and parts of Kent. In these areas, recharge since last summer is estimated to be less than one quarter of the average, 60-80 per cent of the mean is more typical of the English lowlands with average, or above average, totals in the North West. Although it has been a poor winter in terms of aquifer replenishment, the situation for most of the country is not a matter of concern. Only in the districts mentioned above would a prolonged dry summer result in aquifer conditions even approaching those prevailing in the early autumn of 1976.

IH/BGS

12/5/89

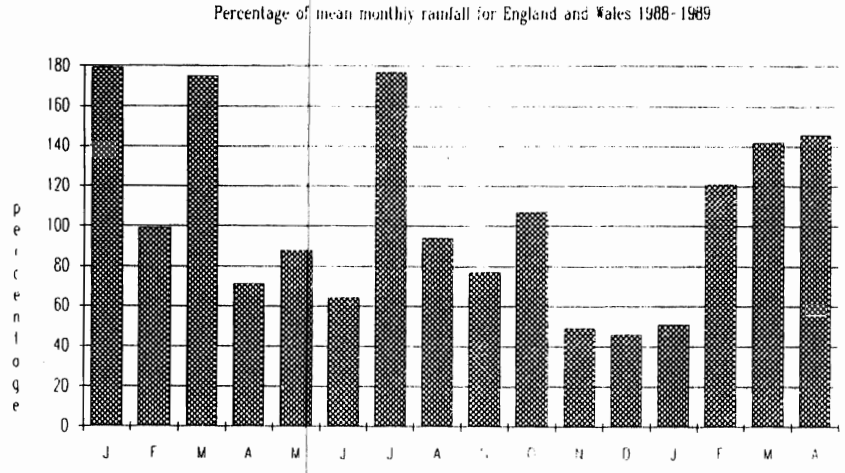
TABLE 1 1988/9 RAINFALL IN MM AND AS A PERCENTAGE OF THE 1941-70 AVERAGE

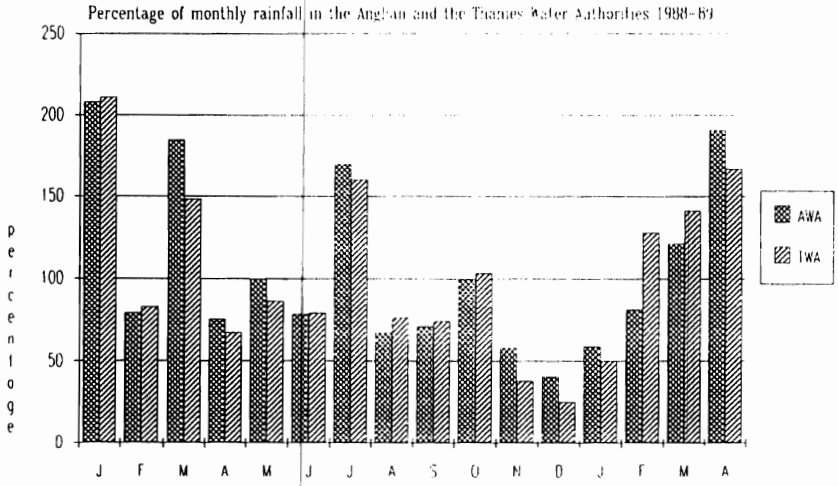
		Oct	Nov	Dec	Jan	Feb	Mar	Apr	Oct-Apr	Approx Return* Period	Apr-Apr	Approx Return* Period
		1988				1989						
England and Wales	mm	89	48	41	44	78	84	85	469	<5	885	<5
	%	107	49	46	51	121	142	146	87		91	
WATER AUTHORITIES												
North West	mm	120	67	86	68	123	113	92	669	<2	1270	<2
	%	102	55	72	61	151	157	120	95		98	
Northumbria	mm	101	73	38	32	70	55	49	417	5	847	<5
	%	135	78	51	40	106	105	89	84		91	
Severn Trent	mm	62	38	34	35	65	69	87	390	<5	758	2-5
	%	95	48	49	51	122	132	168	89		92	
Yorkshire	mm	90	54	38	24	64	63	79	411	<5	801	<5
	%	130	61	51	31	100	118	140	85		90	
Anglia	mm	52	36	22	31	34	48	74	298	<5	590	<5
	%	100	58	42	59	81	121	186	87		91	
Thames	mm	66	28	16	31	60	65	77	344	<5	659	5
	%	103	38	24	50	129	141	167	85		88	
Southern	mm	84	32	20	29	62	75	81	383	5-10	660	10-15
	%	108	34	25	38	109	144	169	79		78	
Wessex	mm	101	34	22	44	89	87	74	451	<5	923	5
	%	123	35	24	52	151	149	137	86		87	
South West	mm	144	55	56	65	135	115	92	662	<5	1081	<5
	%	127	41	41	50	151	137	130	88		93	
Welsh	mm	125	67	65	80	140	151	89	716	<5	1249	<5
	%	97	47	45	59	146	174	103	87		94	

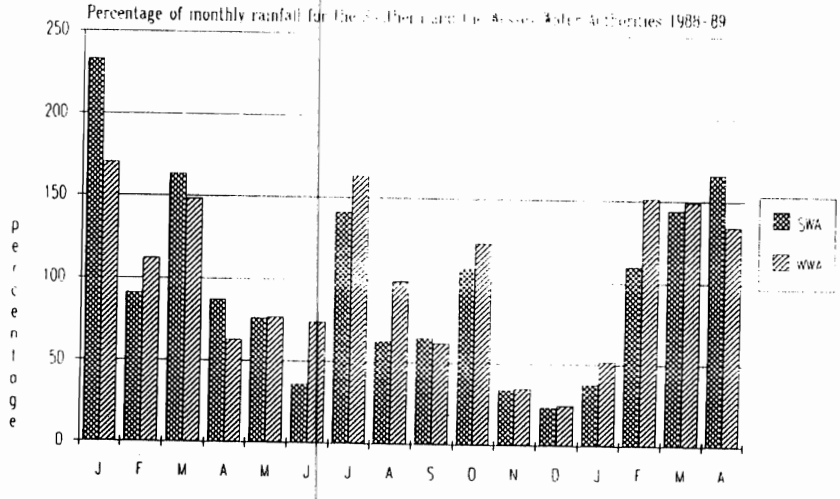
Note: December to April rainfalls are based upon MORECS figures supplied by the Meterological Office.

*The return periods have been estimated from data provided by the Meteorological Office.

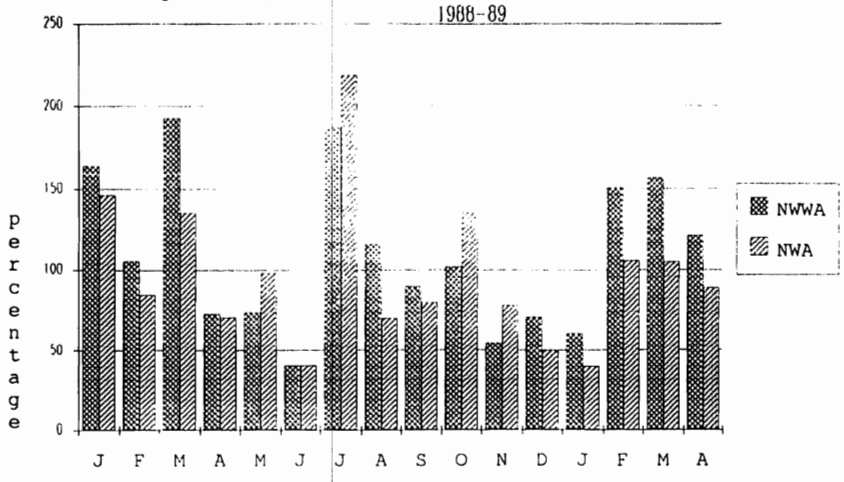
FIGURE 1 MONTHLY RAINFALL - JANUARY 1988 TO APRIL 1989



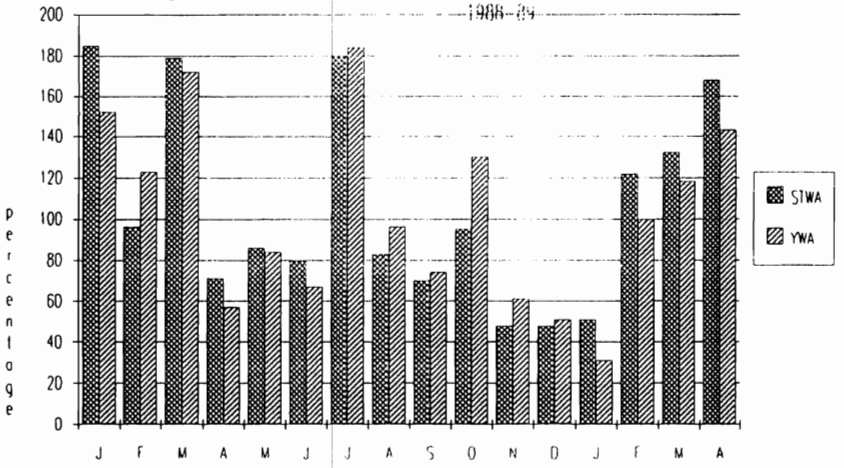




Percentage of monthly rainfall for the Northumbrian and the North West Water Authorities 1988-89



Percentage of monthly rainfall in the Severn-Trent and the Yorkshire Water Authorities 1988-89



Percentage of monthly rainfall in the South West and the Welsh Water Authorities 1988-89

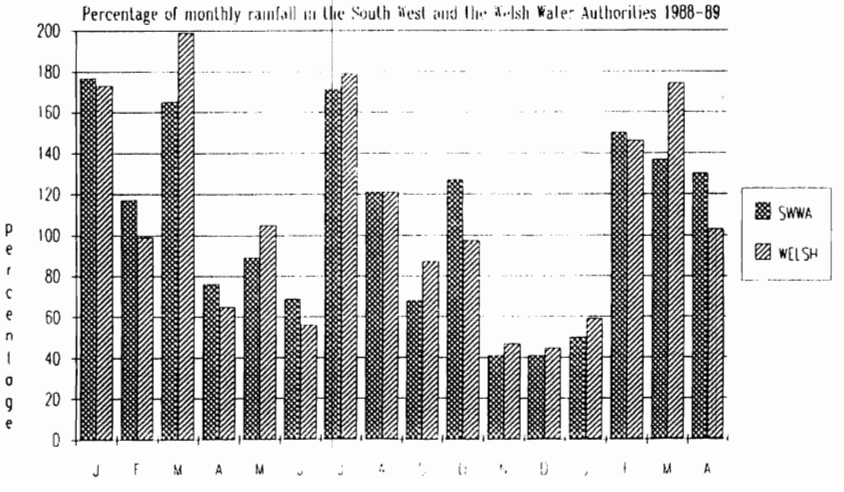
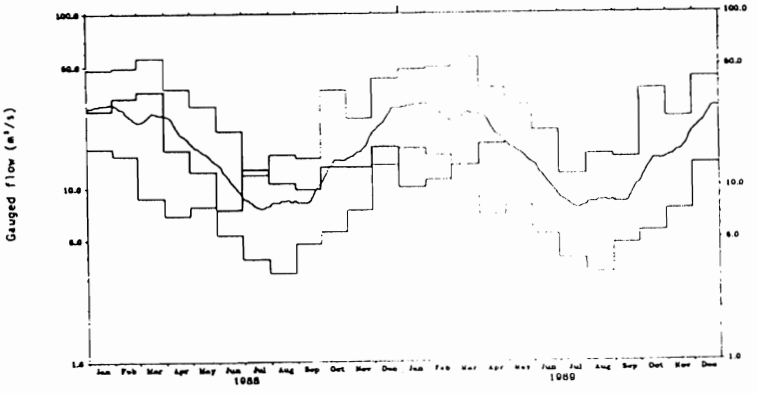


FIGURE 2 MONTHLY HYDROGRAPHS

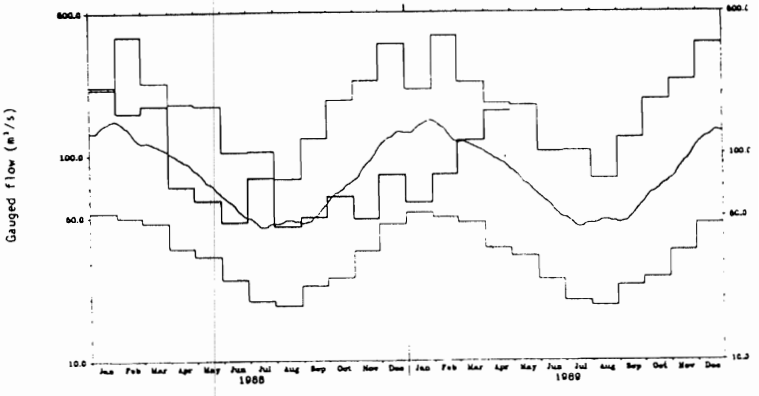
027041 Derwent at Buttercrambe

Monthly mean flows for 1988-1989
+ extremes and 30 day running mean for 1973-1987



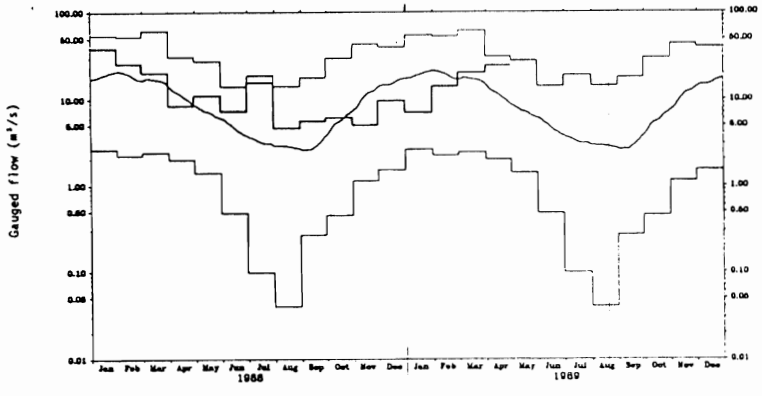
028009 Trent at Colwick

Monthly mean flows for 1988-1989
+ extremes and 30 day running mean for 1958-1987



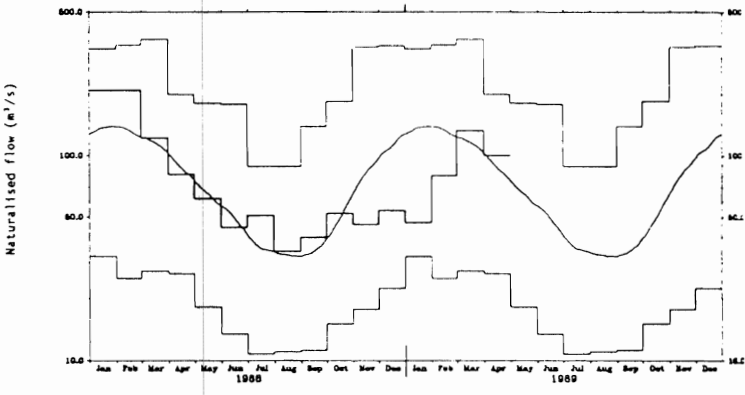
033002 Bedford Ouse at Bedford

Monthly mean flows for 1988-1989
+ extremes and 30 day running mean for 1933-1987



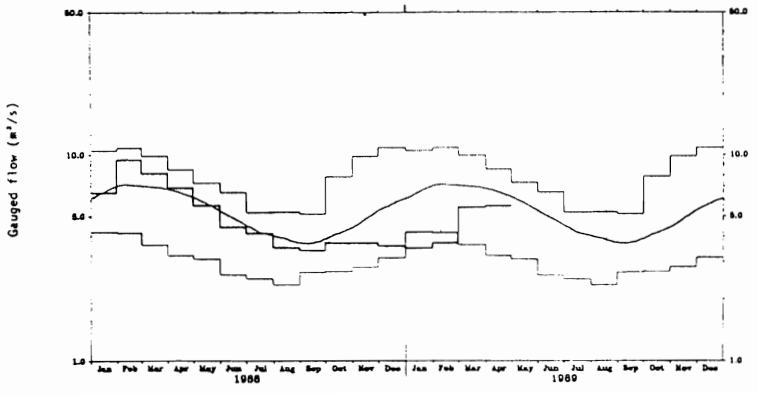
039001 Thames at Kingston

Monthly mean flows for 1988-1989
+ extremes and 30 day running mean for 1883-1987



042010 Itchen at Highbridge+Allbrook

Monthly mean flows for 1988-1989
+ extremes and 30 day running mean for 1958-1987



054001 Severn at Bewdley

Monthly mean flows for 1988-1989
+ extremes and 30 day running mean for 1921-1987

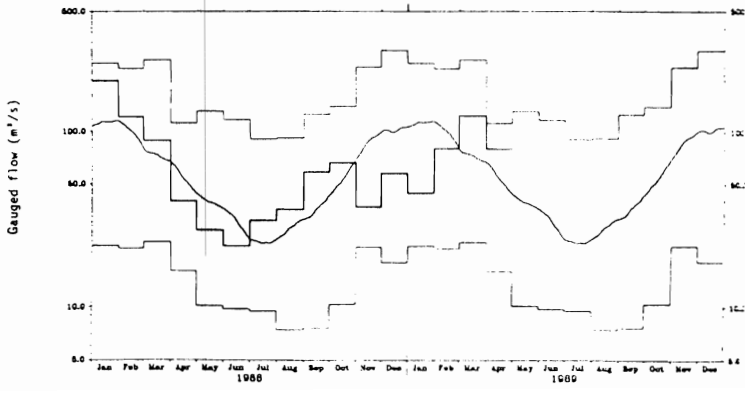


TABLE 2 CATCHMENT RUNOFF IN MM AND AS A PERCENTAGE OF LTA

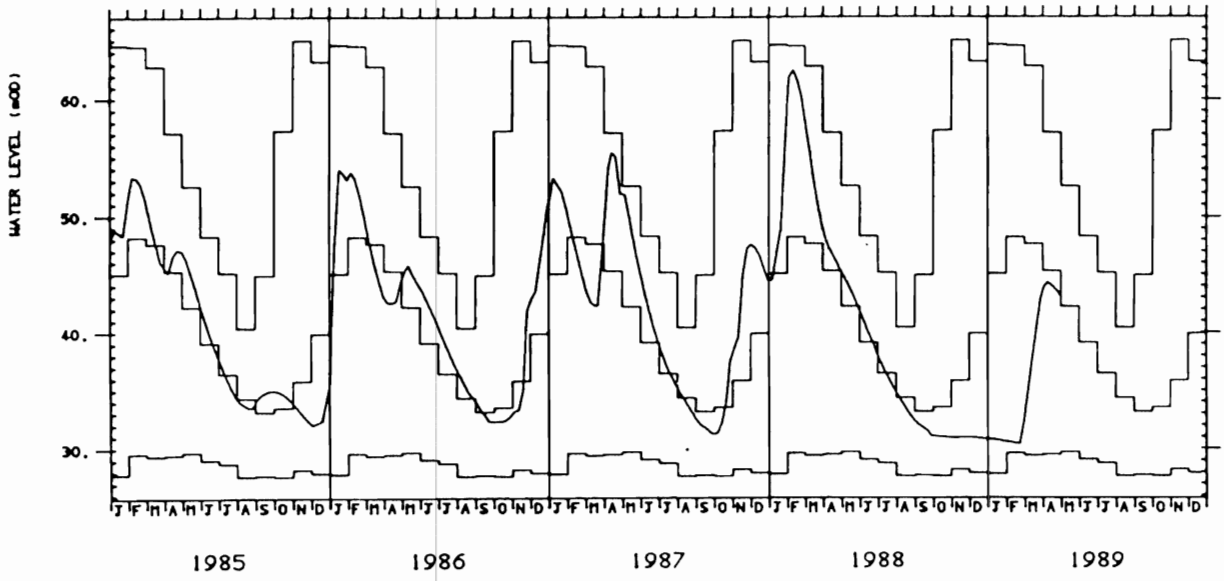
River/Station Name		Oct 1988	Nov	Dec	Jan 1989	Feb	Mar	Apr	Oct 1988-Apr 1989	Rank/No. of Years	Oct 1975-Apr 1976
Wharfe at Flint Ml	mm	80	65	81	42	64	95	71	498	12/34	340
	%	125	80	84	43	84	127	131	92		63
Derwent at B'crambe	mm	22	21	29	17	17	22	29	157	2/16	135
	%	92	81	67	33	39	49	85	59		51
Trent at Colwick	mm	23	17	29	21	26	42	57	215	8/31	112
	%	96	55	64	41	59	105	178	81		42
Lud at Louth	mm	14	13	17	15	12	16	17	104	3/21	48
	%	117	87	85	48	33	42	50	55		25
Witham at Claypole	mm	5	5	9	8	8	12	31	78	4/30	31
	%	56	42	47	31	28	46	148	55		22
Ouse at Bedford	mm	11	9	18	13	23	37	46	157	24/56	31
	%	110	45	64	36	85	119	242	87		17
Colne at Lexden	mm	9	8	11	13	14	23	20	98	11/30	37
	%	100	62	65	59	74	128	154	87		33
Thames at Kingston (nat)	mm	14	12	15	13	19	36	26	135	30/106	67
	%	108	57	50	35	59	116	118	72		36
Kennet at Theale	mm	18	14	16	16	19	31	29	143	3/28	80
	%	113	70	59	46	32	82	94	71		40
Coln at Bibury	mm	15	15	18	15	19	48	44	174	4/26	64
	%	88	60	44	30	56	91	102	62		23
Ouse at Gold Bridge	mm	13	10	11	8	12	44	37	135	2/28	128
	%	43	20	20	13	25	98	109	42		39
Test at Broadlands	mm	20	20	20	20	20	31	27	158	3/31	124
	%	87	80	67	51	40	79	79	71		56
Itchen at Highbrdge	mm	27	27	27	26	25	41	40	213	2/31	204
	%	87	77	63	53	46	79	85	69		66
Stour at Throop	mm	25	13	20	19	28	57	39	201	2/16	96
	%	109	38	59	31	49	110	115	62		29
Tone at Bishops H	mm	42	20	26	25	54	80	40	287	5/28	134
	%	156	45	38	31	72	138	102	74		34
Severn at Bewdley	mm	41	22	36	27	45	77	48	297	16/68	158
	%	121	41	57	38	64	167	177	83		44
Yscir at Pont'yscir	mm	91	39	66	92	130	182	72	672	2/16	445
	%	98	28	43	64	123	160	120	82		55
Dee at Manley Hall	mm	107	60	94	75	88	183	98	705	20/51	445
	%	120	115	69	56	84	194	158	96		60
Lune at Caton	mm	129	68	168	256	167	191	82	1061	23/24	628
	%	71	42	86	174	192	193	106	131		77

FIGURE 3 GROUNDWATER OBSERVATION WELL HYDROGRAPHS

Site name: COMPTON HOUSE

National grid reference: SU 7755 1490 Well number: SU71/23

Aquifer: CHALK AND UPPER GREENSAND Measuring level: 81.37

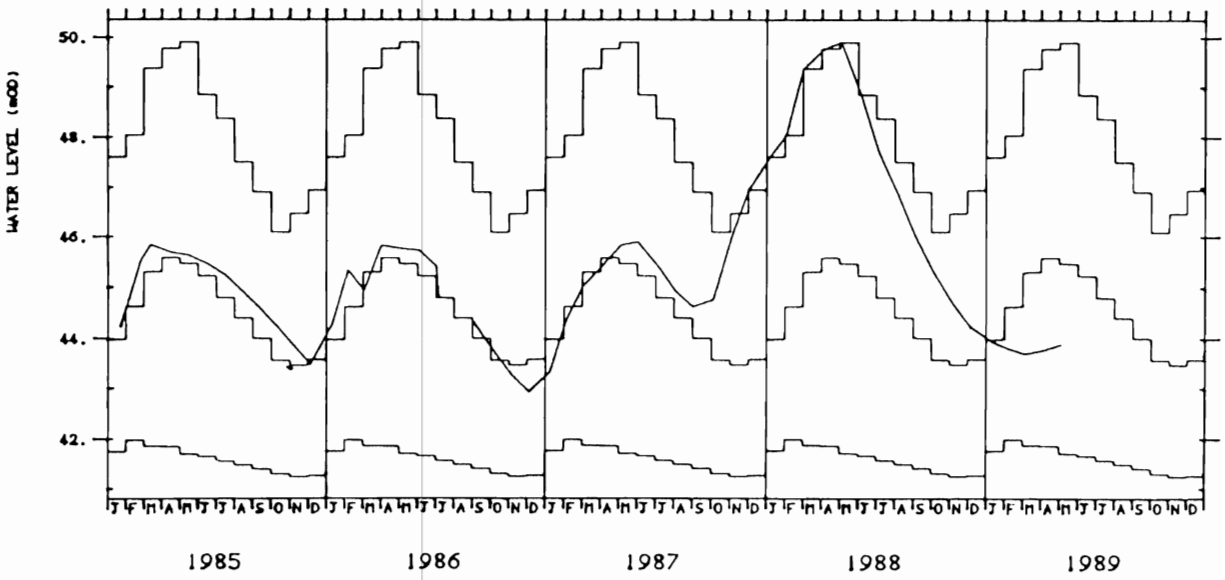


Max, Min and Mean values calculated from years 1894 TO 1988

Site name: WASHPIT FARM

National grid reference: TF 8138 1960 Well number: TF81/2

Aquifer: CHALK AND UPPER GREENSAND Measuring level: 80.20

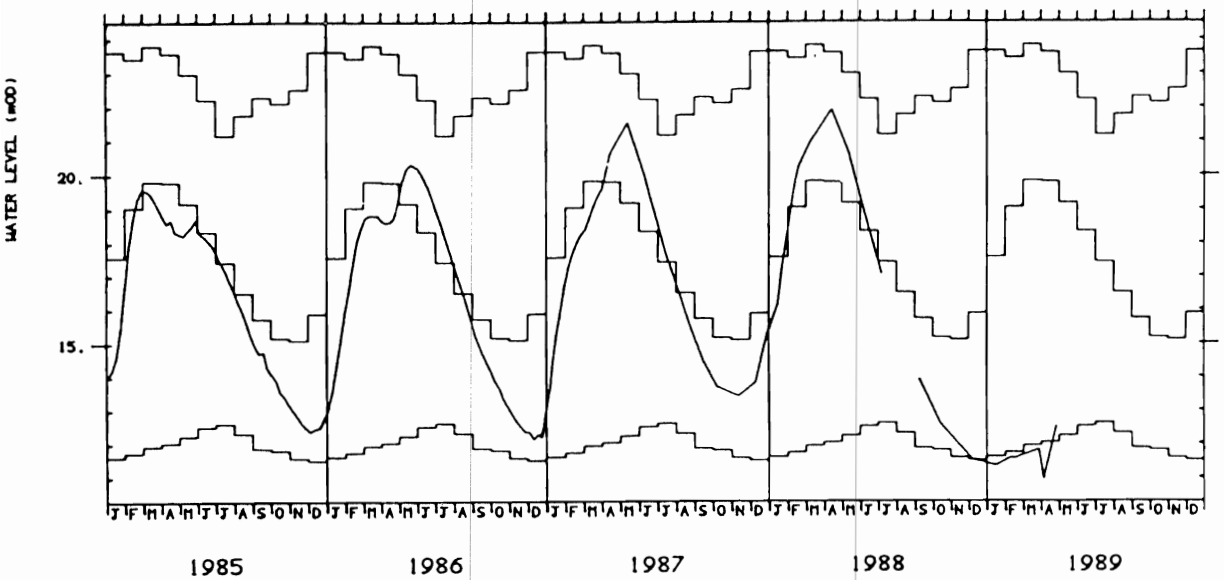


Max, Min and Mean values calculated from years 1950 TO 1988

Site name: DALTON HOLME

National grid reference: SE 9651 4530 Well number: SE94/5

Aquifer: CHALK AND UPPER GREENSAND Measuring level: 33.50



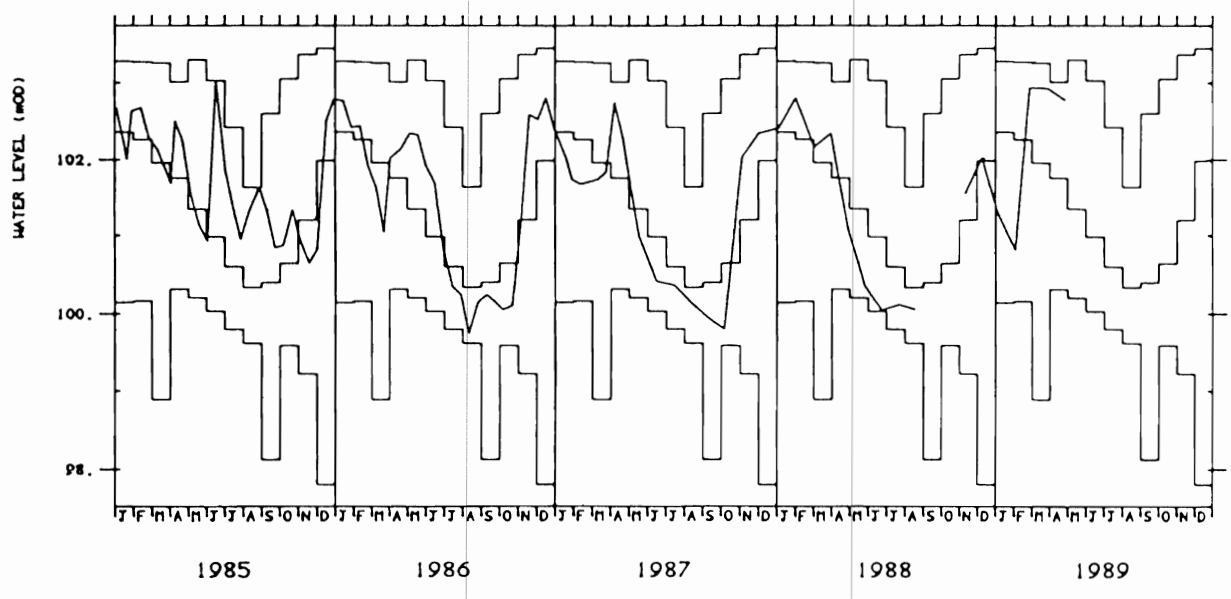
Max, Min and Mean values calculated from years 1889 TO 1988

A break in the data line indicates a recording interval of greater than 8 weeks

Site name: AMPNEY CRUCIS

National grid reference: SP 0595 0190 Well number: SP00/62

Aquifer: MIDDLE JURASSIC Measuring level: 109.70



Max, Min and Mean values calculated from years 1958 TO 1988

A break in the data line indicates a recording interval of greater than 8 weeks